REMARKS

Four new claims have been presented with the present response. Support for claim 57 can be found on page 9-10 and 20-21 of the specification as well as in Figures 2-4. Support for claims 58-60 can be found at page 20-21 of the specification and in Figures 2-4.

As the outstanding Office Action is lengthy and detailed, applicants will respond point by point to the Examiner's assertions.

Claims 1-6 and 28-33 have been rejected in Section 3 of the Office Action as unpatentable over U.S. Patent 6,584,451 to Shoham in view of U.S. Patent 6,012,046 to Lupien, et al. Applicants respectfully disagree.

According to the Examiner, Shoham discloses "(a) creating a buyer's abstract representation of at least one attribute of a request, and the relationship between at least one utility of the request and at least one state of the at least one attribute."

This assessment is inaccurate. The method disclosed by Shoham is only aimed at two particular attributes: price and quantity (see Column 1, lines 41-63). Price and quantity are distinguished attributes in that they are directly related to market conditions, and do not (necessarily) require an abstract representation. However, an abstract representation is required if either or both of price and quantity are to be considered along with other attributes of a request that have no direct market referents. Shoham's invention says nothing about representing the utility of a request and at least one state of an *arbitrary* attribute. The only place Shoham mentions any other attribute is at Column 7, lines 45-52; "Information on Quality of Goods." Here, Shoham discussed making product reviews and descriptions available to the buyer. This is very different from the present invention's (hereinafter referred to as the DME) formal abstraction of the individual attributes of concern to the buyer, and representation by the seller of the attributes inherent in an offer. Note also that in Column 3, line 48, Column 4, line 6 and Column 5, line 8, Shoham's invention requires specific "goods" to be identified. This is substantially different from the specifications used in the DME.

The Examiner then states that Shoham discloses "(b) creating a seller's abstract representation of at least one attribute of an offer, and the relationship between the total price of the offering and at least one state of the at least one attribute."

To the contrary, the cited section of Shoham, Column 2 lines 47-56, mentions only a "dynamic pricing scheme" that adapts to selling volume, demand, and to competitor's prices. There is no mention in Shoham of an ability to relate the total price of an offer to at least one state of at least one *arbitrary* attribute. Also it is clear in Shoham at Column 5, line 15-Column 6, line 6 that the seller's pricing is dictated by the seller's *schedule*, which typically offers discounts for different volumes. Shoham does mention that a schedule could depend on quantity, particular products and options, the prices of competitors, and a new schedule "submitted for other reasons." But Shoham never discloses a representation capable of relating the state of an arbitrary attribute to the total price of the offering. Note that lack of such an explicit representation forces Shoham's system to work incrementally, lowering the price until buyers react, versus the DME mechanism, which takes all buyer specifications, and all seller specifications, and creates the highest-value market via optimization. The only concrete examples of attributes given by Shoham relate the quantity, price and "goods", as in Column 4, line 41-Column 5, line 12. Though quantity and price are attributes of the offer, Shoham does not describe a system for representing *arbitrary* attributes of an offer, or for relating the price of the offer to such attributes. Also, the set of attributes in the DME result in a *specification*, while Shoham discusses "goods" which are identified by name by both seller and buyer.

The Examiner further states that Shoham discloses "(e) signaling that the quantities and identities of assignments are accepted and that the transaction is committed by buyers and sellers."

The mechanisms stated in Shoham Column 6, lines 16-60 do not comprise a *committed* protocol. Buyers are given opportunities to interactively withdraw bids, or to switch from one request of goods to another. This introduces additional problems that Shoham admits cause trouble for usefulness of his system. In contrast, the DME's attribute mechanism offers an easy solution. Buyers can specify, as an attribute, whether they are making committed or uncommitted offers to buy. Sellers may also specify, per their attributes states, that they only will do business with committed buyers, or that committed buyers enjoy a price advantage. The market mechanisms will directly maintain a balance between the risks and rewards of committed transactions. When a transaction takes place between committed buyers and committed sellers in the DME, there is no backing out.

The Examiner also states that Shoham does not disclose "(c) computing a rating for overall satisfaction of the at least one attribute of a request with respect to a given offer" and "(d)

determining the quantity and identity of assignments of sellers' offerings to buyers' requests that produces the best set of matches for a given market". The Examiner then looks to Lupien to correct the deficiencies in the primary reference.

Although Lupien mentions (in the Abstract) "[f]actors other than price and quantity may also be used to determine the degree of satisfaction" he does not describe a representation that is extensible to any number of attributes, does not describe how (non-market) attributes would be used in finding rating for overall satisfaction, and demonstrates only examples involving price and quantity. Also notable, Lupien Column 11, line 53 is talking about the density profile "of the market in a given instrument." This describes a good that has been *identified* (i.e. shares of IBM) rather than *specified* (i.e. shares of a Fortune 500 company). Additionally, it is notable that Lupien (FIG 8, 110, 112, and Column 11, lines 1-16) that Lupien's invention intends to rank-order the satisfaction for all seller-buyer pairings. This ordering is only computationally realistic for the simple (price v. quantity) profiles offered in the examples. Lupien does not disclose a way of rank-ordering the matches for pairings involving an arbitrary number of attributes, or an abstract representation of the buyer's satisfaction with the states of those attributes.

The Examiner then concludes that it would be obvious at the time the invention was made to a person having ordinary skill in the art to modify Shoham by providing using Lupien's satisfaction density profile to compute a rating for overall satisfaction, and using Lupien's crossing network "to determine the quantity and identity of assignments of sellers' offerings to buyers' requests that produces the best set of matches for a given market."

The Examiner's conclusion is not accurate because the combination of these two approaches is not obvious. Shoham's invention is intrinsically one in which sellers program a trading machine by giving it a schedule which makes decisions given various market contingencies, and in which buyers make interactive bids, given a continuous update of the market for the goods that they desire. Lupien's invention uses a special-purpose quasi-optimization technique to perform valuation and matching of orders and offers. There is no obvious way to modify Lupien's invention to obey the schedules provided by sellers, or to satisfy Shoham-style buyers, or buyers clubs. Similarly, Shoham's engine cannot easily be extended to include Lupien's rank-ordering mechanism, because no method is given for arbitration of matches when there is conflict between the seller's schedules and the rank ordering. Both inventions would require extensive additional new matter to provide the functionality offered by the DME. Thus, the references alone or in combination do not teach, disclose or suggest the

present invention. Nor is there proper motivation to combine the references that would somehow made the combination obvious to one skilled in the art. Therefore, the rejection should be withdrawn.

The Examiner next focuses on claim 2 of the present invention and states that Lupien discloses "(a) recording the request and offer data, along with the transaction price and quantity, for the committed transactions, and for other transactions that scored sufficiently well, and for requests and offers that were not matched in the market,"and more specifically, that Lupien "uses a database to store buy and sell profiles." Applicants respectfully disagree.

Because Lupien's buy and sell profiles lack the generality of the DME's buyers abstract representations and sellers abstract representations, the database mentioned by Lupien does not have the same utility in providing market information with respect to price versus an arbitrary attribute. For instance, the DME's Accumulated Value Model can be used to price the market value of specific attributes of a product (for instance, that a 300 Amp alternator is 1.2 times the price of a 200 Amp alternator, or that products from Tier 1 manufacturers cost 10% more than comparable products that are unrestricted in their source). Additionally, the DME's Market Information agent collects information on successful transactions to learn the market value of attributes, but also collects unsuccessful transactions that provide additional information for the marketplace (e.g. that there is an unsatisfied demand for high capacity alternators).

The Examiner further states that Lupien discloses "(b) inferring (COLLECTING) market value relationships from other data sources, such as sellers' advertisements, and or buyers' requests for proposals." (see Lupien Column 1, lines 50-52).

Applicants point out that these lines of Lupien actually refer to US Patent 3,581,072 "AUCTION MARKET COMPUTATION SYSTEM" to Nymeyer, and refer to an invention that only considers identified goods and their prices. The Nymeyer invention looks at all outstanding offers to buy and sell an identified good and uses a search algorithm to find *a single market price* for such a good. In contrast, the DME uses market information only to predict likely prices (and statistical envelopes of likely prices) for arbitrary features of a specification. The market value prediction (using machine learning techniques) of the DME is substantially more informative (providing multi-attribute analysis of current markets in related products) than the single "market price" employed by Nymeyer, (Column 2, lines 4-29) and unlike Nymeyer's invention, the market value is not a binding market price. The DME can sell the same product, from the same seller to different buyers at different prices, because the particular transactions are the ones that

result in the highest value market. Market value prediction is used only to inform buyers, sellers, consortia, and consortium building agents.

Continuing his focus on claim 2, the Examiner states that Lupien discloses "(c) using of mathematical function approximation techniques for constructing market value functions that describe the relationship between price and the states of various attributes in a hypothetical market," because Lupien provides a method to aggregate all allocations between buyer and seller to compute a single size and price for their transaction. Applicants respectfully disagree.

Lupien's method merely determines the average price for the aggregated market. It does not construct a market value function describing the relationship between price and the states of attributes in a hypothetical market. In fact, Lupien's invention merely provides order size and average prices from an actual (historical market) and cannot be generalized to make predictions about other (non-market) attributes.

Regarding claims 3 and 4, the Examiner states that Shoham discloses "(a) forming the best partition of the buyers' requests into groups or singletons of requests whose representation of attributes can be satisfied by the same seller offering." Applicants respectfully disagree with the over-simplification and conclusion of the Examiner.

Because the only attributes that Shoham's system considers are price and quantity, rather than an arbitrary number of attributes, his invention does not construct a representation of attributes that can be satisfied by the same seller offering. In contrast, the DME considers *all* of the attributes of buyer-members of a buyer's partition in constructing the partition.

The Examiner then states that Shoham discloses "(b) forming the combined abstract representation of the requests for the consortium, said representation which will satisfy each buyer in the consortium." Applicants respectfully disagree with the Examiner's oversimplification and conclusion.

Because Shoham's "goods" are identified, rather than specified, he has no opportunity to build a representation of the attributes of a partition involving multiple buyers as in the DME. For instance, if buyer A requests 20 amp alternators, and buyer B requests 21 amp alternators, and buyer C requests 19 amp alternators, and buyer D requests 53 Amp alternators, it is likely that buyers A, B, and C would be aggregated, and the joint representation would be totally satisfied (in this single attribute) by 21 Amp alternators, while buyer D's request would be a singleton, because it is so much more costly (given information from the accumulated market value model) than 21 Amp Alternators.

The Examiner next asserts that while Shoham does not disclose the feature, Lupien discloses "(c) constructing an artificial negotiating entity that will represent at least one consortium, and can conceal the identities of the buyers in the consortium," and that it would have been obvious to combine the disclosures of Shoham and Lupien to "not disclose the identity of the trader as a business practice and better competition." Applicants respectfully disagree.

The cited portions of Lupien (Column 1, lines 40-67) refer to several existing systems that provide anonymity for participants. However, none of the systems described create an artificial negotiating entity, to negotiate on behalf of a consortium. Concealing the identities of buyers is only one of the benefits of an artificial negotiating entity. For instance, such an entity can also react to opportunities in the market-place far more rapidly than is possible for all of the buyers that it represents.

While the Examiner refers to present claims 3-4 in page 4 of the Office Action, he never mentions any of the limitations from claim 4, which discusses the construction of *seller's* consortia. The formation of seller's consortia is analogous to formation of buyer's consortia, but the actual results are far different from those in buyer's consortia. For instance, buyer's consortia form when multiple buyers have *similar specifications* for things that they desire. On the other hand, seller's consortia are typically formed when sellers have different (and *complementary*) specifications of offerings. For instance, an offering of an alternator which has no attached warranty can be combined with a third-party offering of a warranty, to form a consortium abstract representation, which would be used by the consortium's artificial negotiating entity to attract buyers who desire alternators with warranties. Therefore, the rejection is improper.

Regarding claim 5, the Examiner states on page 5 of the Office Action that Lupien discloses "wherein the at least one attribute includes both intrinsic qualities of the object of the request or offer, and extrinsic qualities of the transaction or market protocols, wherein the extrinsic attributes comprise commitment protocols and time qualifications," and that it would have been obvious to combine the disclosures of Shoham and Lupien to include intrinsic and extrinsic qualities of a trading object to describe the nature of the object of the trade.

Lupien mentions using external variables such as "current interest rate, quality of the issuer, and coupon rate" to create additional satisfaction density profiles. However, Lupien's satisfaction density profile does not distinguish between qualities of the object of the request or offer and extrinsic qualities of the transaction or market protocols. In fact, *all* of the variables mentioned by Lupien are *intrinsic* (in the sense used by the DME invention) to the offering.

Additionally, though Lupien's invention allows the input of "additional satisfaction density profiles", he provides no means computing a rating for overall satisfaction of multiple satisfaction density profiles with respect to an offer. Thus, Lupien's invention does not accomplish the capabilities of DME Claim 5 in the context of DME Claim 1 and DME Claim 2. Furthermore, none of the variables mentioned by Lupien is an extrinsic attribute comprising a transaction or market protocol. Additionally, "combining the disclosures of Shoham and Lupien to include intrinsic and extrinsic qualities of a trading object to describe the *nature of the object* of the trade" still would not give the combined invention the capability of representing or using extrinsic qualities, because extrinsic qualities are *independent* of the nature of the object of the trade. For instance, "Amps > 20" is intrinsic to an alternator request, and "three year warranty" is intrinsic to an alternator offering, but "Vikery auction" is not intrinsic to a request or an offering, and has nothing to do with the item being purchased. Instead, it specifies the type of market protocol which is allowed or desired on the part of a participant. Thus, the rejection is improper and should be withdrawn.

Regarding claim 6, the Examiner cites Column 2, lines 33-65 and asserts that Shoham discloses "(a) combining abstract representations from at least two market participants, to maximize the satisfaction for the consortium of those participants," and "(b) using buyers' consortiums rather than individual buyers and sellers' consortiums, or individual sellers, in determining the best set of matches, whereby a transaction can be accomplished between consortia, rather than individual buyers and sellers." The Examiner's conclusion is inaccurate.

Shoham does not use an *abstract representation of arbitrary attributes* for at least two market participants, and thus cannot combine those representations. Shoham's representation clearly lacks the ability (on either the buyer's or seller's side) to fully represent the desired or intrinsic states of attributes of particular market items. Also, it is clear from Shoham's description (Column 2, lines 41-56), that the buyer's and seller's consortia are to participate incrementally and interactively; making bids or offers, looking at results, and adapting prices or bids. Conversely, by constructing a combined abstract representation of requests and offers, the DME allows the market to be evaluated in a single round of optimization. Therefore, the rejection should be withdrawn.

The Examiner concludes that Claims 28-33 have the same limitations as 1-6 respectively, and thus are rejected under the same rationale. As discussed previously, neither Shoham, nor a combination of Shoham and Lupien provide the capabilities described and claimed in claims 1-6

of the present invention. Thus, the rejection of claims 28-33 under these references should likewise fail.

Claims 7-13, 16, 18, 22-27, 34-40, 43, 45 and 49-56 stand rejected under 35 U.S.C. 103(a) as unpatentable over Shoham and Lupien as applied to claims 1-6 and 28-33, further in view of U.S. Patent 6,141,653 to Conklin. Applicants respectfully disagree. As discussed above, Shoham and Lupien fail as primary references and Conklin '653 cannot cure those deficiencies alone or in any combination.

Regarding claim 7, the Examiner claims on page 6 of the Office Action that Shoham discloses "(a) forming the best partition of the buyers' requests into groups or singletons of requests whose representation of attributes can be satisfied by the same seller offering" and "(b) forming the combined abstract representation of the requests for the consortium, said representation which will satisfy each buyer in the consortium." Applicants disagree with this characterization of the reference.

It is clear from Shoham, (see Column 2, line 57 to Column 3, L7 and Column 4, line 47 to Column 5, line 14) that OBCS is not (by itself and automatically) forming partitions of buyers. Instead, different buyers are *electing* to join different buyer's clubs, potentially winding up with partitions that are far from optimal with respect to the DME's Accumulated Value Model. Also, it is clear from Column 4 line 47 to Column 5, 1 that buyers are incrementally and interactively participating in the market. This behavior is optional within the DME, but is not the typical DME behavior where a buyer provides a specification of the goods that he wants, and the system automatically places his order in the correct consortium (if any), automatically represents his interests in finding the most satisfactory (versus any number of arbitrary attributes) offer, and automatically performs transactions to acquire the specified goods.

The Examiner concedes that Shoham does not teach but argues that Conklin discloses "(c) constructing an artificial negotiating entity that will represent at least one consortium, and can conceal the identities of the buyers in the consortium and automatically joining sellers' offerings in a consortium by: (d) forming the best partition of the sellers' offerings into groups or singletons of offerings which considered together achieve the highest values on hypothetical market transactions;(e) forming the abstract representation of the offerings for the consortium, said representation which will represent each offer in the consortium; and (f) a means of constructing an artificial negotiating entity that will represent at least one consortium, and can conceal the identities of the sellers in the consortium, and using the market value data from

transactions to construct mathematical function approximations predicting the value of states of attributes for hypothetical transactions to construct a stream or compendium of market information."

In its abstract Conklin describes an engine for *iterative bargaining*, wherein participants make offers, evaluate proposed offers, and make counter offers. This is substantially different from an artificial negotiating entity that will represent at least one consortium, and automatically joining sellers' offerings. Though the DMF may be used iteratively (by using uncommitted protocols), the *intrinsic mechanism* is that of automatic consortium creation, automatic value matching, and automatic transaction. It is clear in Conklin that the buyer has not pre-specified the attributes of an intentional purchase, but instead has specified suppliers who (he believes) may produce products with desired attributes (see Column 8, lines 49-64). Using Conklin's invention, there is no way for the buyer to explicitly represent his degree of satisfaction with the state of various attributed mentioned in a specification. Since this information is not disclosed, there is no way for an entity (such as one of Conklin's "sponsors") to capture market data related to such attributes, nor to capture seller data related to such attributes. Additionally, Conklin's invention fails to negotiate on behalf of the buyer, in terms of the attributes and states of satisfaction.

A "sponsored community" in the sense used by Conkin's (Column 18, lines 7-11; lines 18-26; and Column 19, lines 15-26) is a mechanism for direct human-to-human communication and negotiation, and does not directly represent or consider a specification buyers' requirements, nor a sellers offerings. Because the specification is missing, information collected by Conklin's invention is insufficient for forming the best partition of buyers; or for forming an abstract relationship which will satisfy each buyer in the consortium; or to constructing an artificial negotiating to represent a consortium. Lacking a detailed specification of buyers' states of satisfaction, no entity can adequately represent their interests. The same arguments apply to the construction of sellers consortia. It is especially noteworthy that Conklin mentions the appointment of a [human] moderator for their negotiations, and the use of teleconferencing to aid in negotiations (see Column 18, lines 7-11 and lines 18-26). This shows that Conklin is speaking in terms of iterative human-to-human negotiations, and not in terms of an automatic system that represents the interests of the particular parties or consortia. If the system were acting in such an automatic way, there would be no need and no opportunity for moderators to intercede.

The Examiner further states regarding claim 7 that Lupien discloses using market value data to construct mathematical function approximations predicting the value of states of attributes for transactions to construct a stream or compendium of market information to achieve the highest value of mutual satisfaction.

However, Lupien does not disclose how to represent the degree of buyer or seller satisfaction with respect to any number of arbitrary attributes. Rather, Lupien provides a procedure for comparing limit profiles with each other and with available market orders, but all satisfaction relates to the price or size of the orders (see Column 7, lines 30-53; Column 20, line 54 to Column 22, line 45). While Lupien *mentions* in the abstract "using factors other than price and quantity to determine the degree of satisfaction," he provides no method for using an arbitrary set of such factors. Rather, Lupien's satisfaction density profiles, as discussed in Column 5, lines 1-26 are only 2-dimensional, and even though Lupien mentions adding external variables to the satisfaction density profile, he does not show how a multidimensional match would be accomplished. Even if it a person having ordinary skill in the art had determined to combine the disclosures of Shoham, Lupien, and Conklin, the combined invention would not have provided a method for predicting the costs of attribute states in hypothetical transactions, or the value of states of attributes for hypothetical transactions, because none of the prior inventions provide an explicit representation of buyers, buyers' consortia, sellers, or sellers' consortia satisfaction with an arbitrary set of attributes. Lacking such a representation, the combined invention cannot make estimates in terms of the arbitrary set of attributes. Therefore, the rejection should be withdrawn.

Regarding claims 8-13, the Examiner states on page 8 of the Office Action that Lupien discloses further "comprising numerically representing the determination of best assignments and quantities as an optimization problem and optimizing the assignments and quantities by finding the total of each buyer's and each seller's satisfaction with the transactions to be committed," and "comprises matching the at least one attribute of a request and the at least one attribute of an offer by inferring the match of the attribute qualities of a request which are logically implied by attribute qualities of an offer", and "further comprising determining the quantity and identity of assignments of sellers' offerings to buyers' requests which produce the best set of feasible matches for a given market", using "linear regression", "numeric optimization", and "using a total market excess value as the measure of highest total market value." Applicants respectfully disagree with the Examiner's assertion.

While Lupien does mention in using linear regression to fit center-points of a price spread versus size, but discloses no way to relate attribute qualities of arbitrary attributes to the best assignments (see Column 12, lines 34-40). Also, Lupien discloses an incremental quasi-optimization procedure (see Column 13, line 48 to Column 15, line 19). Lupien also admits that this procedure does not result in the global optimum assignments, that is, it does not actually maximize the mutual satisfaction (even mutual satisfaction within Lupien's limited representation of profiles) of the market participants with respect to assignments (see Column 15, lines 26-28). Lupien then proceeds to describe his version of the general optimization problem, which "maximizes the total mutual satisfaction over all participants, while simultaneously maximizing the total trade volume." (see Column 15, line 61 to Column 16, line 9). Lupien's formulation describes a different optimization model in several aspects. First, it does not explicitly consider the buyers satisfaction with all of the variety of arbitrary attributes that a buyer might specify. Second, as shown by the fact that Lupien separates the consideration of mutual satisfaction and trade volume, he does not use a model that produces the market with the largest total excess value. As such a market does not necessarily seek the highest trade volume, and as such a market is driven by satisfaction with any number of arbitrary attributes, posed by either the buyer or the seller. While Lupien mentions the use of a satisfaction density function to consider other variables, Lupien does not offer a procedure for balancing satisfaction among multiple profiles (see Column 18, line 48 to Column 19, line 13). For instance, if the profile of one of Lupien's variables favored an assignment, but the profile of a different variable was not totally satisfied with the assignment, it is unclear how or whether Lupien's invention would make that assignment or not. In contrast, the DME provides a general mechanism for evaluating the quality of such cases. The DME assignments are made to produce the maximum excess value of the market, and that excess value evaluation encompasses all of the specifications of the buyers and sellers with respect to satisfaction of attributes.

Regarding claims 16 and 18, the Examiner states on page 9 of the Office Action that Shoham discloses "wherein the request and offer data, the transaction price and quantity, the committed transactions, other transactions that scored sufficiently well, and the requests and offers that were not matched in the market are made available to market participants."

In fact, Shoham discloses all information available to market participants and does mention making aggregate information available, on prices buyers are willing to pay (see Column 7, line 44 to Column 8, line 17). However, nothing in Shoham discloses the request and offer

data as they exist in the DME invention, as that data includes information on an arbitrary set of product attributes, states, and levels of satisfaction, both from the buyer's side and the seller's side. This information is never represented, used, collected, or distributed by Shoham.

Regarding claim 18, the Examiner states that Shoham discloses "wherein an ontology is used for inferring the match of the at least one attribute state of a request which is logically implied by the at least one attribute state of an offer." (see Column 1, lines 16-30 and Column 9, lines 11-14).

Importantly, Shoham makes no mention of an ontology in these sections. In fact, the word "ontology" is never used in Shoham's patent. None of the descriptions mentioned bear a resemblance to an ontology, which is a special kind of meta-data repository that describes the conceptualization of a domain. Therefore, the rejection of claims 16 and 18 is improper and should be withdrawn.

Regarding claims 22-24, the Examiner concedes on page 9 of the Office Action that Shoham4) that Shoham does not disclose "invoking auction protocols when there are at least two requests per one offer or at least two offers per one request, wherein the abstract representation of the relationship of the utility of an attribute of the request is created using at least one technique selected from the group consisting of: (a) linear functions, (b) piece-wise linear functions,(c) logistic functions,(d) cubic splines, (e) look-up tables, and (f) other numeric functions that compute utility with respect to a given attribute's states, and wherein the abstract representation of the relationship between price of the offer and at least two states of an attribute of the offer, is created using at least one technique selected from the group consisting of: (a) linear functions,(b) piece-wise linear functions, (c) logistic functions,(d) cubic splines, (e) look-up tables, and (f) other numeric functions that compute price with respect to a given attribute's states." To justify the omission, the Examiner asserts that statistical calculations are commonly used to predict the probability of success of a costly experiment, and that it would have been obvious to add statistical analysis to the inventions of Shoham, Lupien, and Conklin to predict the success of an auction prior to auctioning a good or service. Applicants disagree with the Examiner's assessment.

As discussed previously, none of the representations of Shoham, Lupien, and Conklin support the analysis of the state of satisfaction of an arbitrary set of variables. Thus, applying predictive statistics to auctions within the cojoined Shoham, Lupien, and Conklin invention

would still not produce estimates on auction outcomes for goods and services that are described by specification of arbitrary attributes. The rejection should therefore be withdrawn.

Regarding claim 25, the Examiner states on page 10 of the Office Action that Shoham discloses further "comprising communicating the abstract representations of requests and offerings by termsheets and offersheets, respectively." Such a broad conclusion is inconsistent with the teachings of the reference and far more limited than the present invention. The quotes and purchase terms mentioned by Shoham communicate far less information than the termsheets and offersheets of the DME. Specifically, termsheets and offersheets communicate information about the relative state of satisfaction of a buyer or seller with all possible states of attributes of interest to that buyer or seller. Therefore, Shoham is once again not on point.

Regarding claim 26, the Examiner concludes that it is well known that an agent can request for employment. While it is true and well known that agents can request employment, there is no prior art that describes the requests as employment positions and describes the offerings as employee attributes and compensation requirements, in the sense that those requests and attributes are used in the DME. It is also non-obvious to use the invention in this way, which inverts the typical buyer/seller arrangement of markets. Claim 26 of the present invention shows that the employee may be selling his capabilities as attributes, while the employer is seeking employees that produce the most satisfactory states with respect to their attributes of interest. Note that the actual flow of money (from employer to employee) runs counter to the direction of the market transaction. The rejection should be withdrawn.

On page 10 of the Office Action, the Examiner states regarding claim 27 that Shoham discloses describing the requests as tasks to be accomplished, and describing the offers as agents, people and or software, willing to accomplish those tasks. However, Shoham's invention does not support the representation of tasks as a set of arbitrary attributes and the satisfaction with respect to states of those attributes. Nor does Shoham's invention support the representation of agents, people, or software with respect to those the attributes which describe satisfaction of those tasks.

As claims 34-40, 43, 45 and 49-54 have the same limitations as claims 7-13, 16, 18 and 22-27, the same arguments apply and the rejections should be withdrawn.

The Examiner rejects claim 55 on page 11 of the Office Action and states that Shoham discloses "wherein the information is communicated through the internet by internet protocol messages." While, Shoham does mention web and internet communication, it simply does not

mention this communication with respect to the system described by the DMF invention. Therefore, the rejection is improper.

The Examiner states on page 11 of the Office Action regarding claim 56 that Shoham does not explicitly disclose "wherein buyers and sellers access the system via web pages, Java clients, or other executable client programs" but that this is a well known use to which buyers and sellers may use web browsers to place orders.

Though it is agreed that many sales and purchases are currently made via web pages, Java clients, or other executable client programs, those sales and purchases do not have the advantage of using the DMF invention to identify the best assignments. The use of web pages, Java clients, or other executable client programs is particularly well suited to markets maintained by the DMF, as they permit easy construction of the required termsheets and offersheets, and they offer ubiquitous, secure connections to a multitude of potential market arenas.

Therefore, the rejections should be withdrawn.

Claims 14, 15, 17, 41, 42 and 44 are rejected over Shoham, Lupien and Conklin as applied to claims 10 and 37, and further in view of U.S. Patent 6,236,977 to Verba, et al. According to the Examiner, the primary references do not disclose the use of a multagent system to distribut processing over many processors.

The Examiner states that neither Shoham, Lupien, and Conklin disclose "[a] method of claim 10 further comprising using a multiagent system to distribute the processing across many processors and memory devices to achieve timely calculations of best assignments and quantities, wherein a measure of the utility of the at least one state of the at least one attribute is used to compute a rating for the overall satisfaction of a request with respect to a given offering by using at least one technique selected from the group consisting of: (a) weighted fuzzy-logic conjunction operators, (b) weighted geometric means,(c) a weighted version of Yager's T-NORM, (d) weighted arithmetic means, and (e) a weighted combination, with the weights derived via analytic hierarchy analysis." However, according to the Examiner, Verba discloses these steps. Applicants disagree with this contention.

The agents mentioned by Verba are computerized real-estate agents, not agents in the multi-agent system sense of the term (as understood by computer science practitioners). A *multi-agent system*, is a recent distributed artificial intelligence software paradigm that enables robust scaleable decentralized software systems. Verba does mention "market agents that encapsulate a plurality of attributes and operations performed by legal entities." Verba's description goes on to

describe an object-oriented system rather than multi-agent based system. Many of the basic capabilities of a multi-agent system, (which are provided by systems such as DECAF, Zeus, and FIPA-OS) are lacking in Verba's system). Verba describes a "virtual agent," implemented within an object-oriented system, that is associated with each user, and supports personalization of the system for that user (see Column 6, lines 24-53). Again, this sense of "agent" is far more limited compared with use in the multi-agent programming paradigm (see also Column 6, line 38). Verba also states that "the virtual personal assistant handles many of the functions currently handled by human assistants of the (human) real estate agents."

As stated in the specification of the present invention, "[i]n a preferred embodiment, the software system used to represent and communicate buyers and sellers views of the transaction, to find the transactions which maximize the markets excess value, and to provide a means for automatically or interactively achieving agreements to the proposed transactions, and to preserve requisite privacy, anonymity, and legitimacy of market participants, is built using a methodology known as a *multiagent system*. Multiagent systems are an approach to software architecture that support *intelligent interaction, scaleability, and robustness, while permitting relatively independent development of component software modules*. Rather than function-call relationships between modules, message-passing conversations are the customary way to describe interaction. *Each individual agent is capable of responding to a variety of messages, creating agendas to achieve plans, and executing a variety of tasks to achieve those plans.*"

Furthermore, Verba does claim to be performing optimization via application of an adaptive scoring function, but describes a system of score improvement, rather than (comprehensive) score optimization. Finally, the marketing campaigns of Verba do not include the abstract attribute representation of the DME, and have no means of calculating the market value, given such a representation, and no means to maximize the value of such a market by making the best set of allocations. Therefore, the rejections over Verba, alone or on combination, are improper and should therefore be withdrawn.

In response to the Examiner's comments on pages 12-14 of the Office Action, applicants inadvertently used the word "coalition" when "consortium" was intended. The Examiner pointed out that this word was not used in the rejected claim. As indicated above, this was an inadvertent omission and the use of consortium should make the argument understandable. As applicant clearly claims a consortium in multiple claims, these comments should now be moot.

The examiner states on page 13 of the Office Action that Lupien is pertinent to the field of endeavor, even though Lupien's invention is aimed at establishing an auction market for "fungible goods." Lupien's invention is aimed at markets in liquid assets, such as futures, derivatives, options, bonds, currencies, and the like. The method assumes an environment of online traders who are interested in buying financial instruments, and are willing to create a two-dimensional satisfaction profile reflecting their attitudes about various potential sales. The DME does not assume such a market, nor does it require buyers or sellers to create a two-dimensional satisfaction profile. Instead, the DME permits buyers and sellers to easily specify an N-dimensional representation of all of the states of all of the attributes of interest with respect to a particular good or service. Many of the attributes of interest for general goods and services are not relevant to Lupien's domain, and have no vehicle for representation in Lupien's invention.

The examiner further states that, since both Shoham and Lupien are for trading between a buyer and seller using a bid and offer mechanism they would have provided an obvious basis for the invention. Applicants respectfully disagree. There is no suggestion or motivation to combine the capabilities of either Shoham or Lupien to somehow arrive at the present invention, and the combination of Lupien and Shoham is far from obvious. In fact, the two inventions use very different and incompatible methods to accomplish the trading between buyer and seller. Shoham's invention is basically a mechanism for the aggregation of orders by many small (quantity) buyers to achieve some savings via volume. Shoham's invention applies to general goods and services, but considers no information beyond the identity of a product. Lupien's system is one that uses satisfaction density profiles to establish "market prices." The allocation procedures used by Shoham and Lupien are incompatible and neither subsumes the other. Note that there is no market price used by the DME to make transactions. The only quantity similar to a market price is the statistically predicted price which, like the predicted states of other attributes, is learned from market history, and serves to guide the construction of consortia by the Buyer's Consortium Agent and the Seller's Consortium Agent.

The examiner then states on page 14 of the Office Action that Lupien's invention, which "maximizes sequentially the mutual satisfaction at each stage of the allocation process, by assigning allocations based upon the highest remaining mutual satisfaction value" would provide a basis for the DME that would be available to one of ordinary skill in the art.

The procedure that Lupien discloses fails to find a globally optimal solution. That is, even though Lupien's approach improves the allocation on each iteration, it stops in a local optimum that may be arbitrarily distant from the best possible allocation. The DME, which exploits agent-based technologies to distribute computation over any number of processors, and which employs a coordinated group of local and global optimization techniques, provides a model and a mechanism to perform efficient global optimization of assignments between buyers and sellers.

The examiner further states that the applicant does not disclose the specification and page numbers for the definition of ontology mentioned in the applicants September 26, 2005 remarks. Specifically, applicants stated: "Furthermore, Shoham does not disclose use of ontology. An ontology is a database of concepts and relations among those concepts, that permits a conceptualization to move from one system to another, even thought the local terminology within the two systems differs" The DME specification reads at page 20, line 3-13 "[t]o support this functionality, the Market Information Agent (MIA module 1703) contains a market-specific ontology sub-module (1704) which can provide canonical translation of dimensions, and determine whether market features requested by the buyer are logically implied by the offerings of the seller. Some of the knowledge base of this module is universal, such as Système Internationale d'unités (SI) representation of all units, while other elements are unique to a given collection of goods or services. For instance, 12 Volts is a nominal voltage for an alternator, which may actually produce 12.8 V DC, yet 12 Volts, used in the context of semiconductor power supplies may be a much more precise term; 12.8 volts in that context might be completely unacceptable. The DSA (1711) can request canonical translation and logical equivalence of terms from the market-specific ontology sub-module (1704) in cases where features do not match on a simple name or value basis." Furthermore, though the definition of an ontology is not specifically provided in the specification, it is a standard usage of the term, common in the art and among computer scientists that work in the area of knowledge representation. (see, for example, http://www-ksl.stanford.edu/kst/what-is-an-ontology.html)

In view of the above amendments and remarks, claims 1 through 56 and new claims 57-60 are considered to represent a novel and unobvious advance in the art. We believe that a prompt issuance of a Notice of Allowance for these claims is in order and such action is requested. If any issues remain outstanding, the Examiner is urged to contact the undersigned to expedite their resolution.

Respectfully submitted,

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Date: July 5, 2006